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NIP 525-000-82-64 REGON 000053835 KRS 0000126823

Lodz, 16-02-2021

Certificate of analysis No K/036/01/2021 (1/1)

Subject of analysis: **Device YANEX 2M**

State of the subject: correct

Customer: **MBS BARTŁOMIEJ SYREK**
95-054 Ksawerów, ul. Klonowa 14

The device for testing deliverd by the Customer: 08-02-2021
The tests began: 09-02-2021
The tests finished: 14-02-2021

Type of analysis	Method	Results					
Antimicrobial efficacy against:	Own methodology Instruction I-86	reduction in the number of microorganisms					
		at a distance of 1 m			at a distance of 2,5 m		
		$R_{1\ min}$	$R_{5\ min}$	$R_{10\ min}$	$R_{1\ min}$	$R_{5\ min}$	$R_{10\ min}$
Staphylococcus aureus ATCC 25923		100.00%	100.00%	100.00%	84.15%	100.00%	100.00%
Bacillus subtilis ATCC 6633		100.00%	100.00%	100.00%	83.30%	100.00%	100.00%
Escherichia coli ATCC 25922		100.00%	100.00%	100.00%	92.13%	100.00%	100.00%
Klebsiella pneumoniae subsp. *pneumoniae* ATCC13883		100.00%	100.00%	100.00%	96.12%	100.00%	100.00%
Aspergillus brasiliensis (A. niger) ATCC 16404		88.60%	100.00%	100.00%	69.85%	93.53%	100.00%

Authorized:

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Accepted:

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Evaluation of the antimicrobial effectiveness of YANEX 2M

Aim and scope of the study

The aim of the study was to determine the antimicrobial effectiveness of **YANEX 2M** (Certificate of analysis No K/036/01/2021), against microorganisms: *Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922, *Bacillus subtilis* ATCC 6633, *Klebsiella pneumoniae* subsp. *pneumoniae* ATCC13883, *Aspergillus brasiliensis* (*A. niger*) ATCC 16404 (molds).

Experimental procedure

The tests were carried out in accordance with own methodology developed in Laboratory (Instruction No. I-86, item 6.4 "Checking the effectiveness of UV lamps").

A suspension of the test strain (density 1 on the McFarland scale) was prepared, followed by a series of ten-fold dilutions. 1 ml of suspension was taken from the appropriate dilution and spread on 140 mm diameter plates with appropriate agar medium (PCA, YGC), to grow from 900 cfu to 1100 cfu (colony forming units). Control plates (without UV- disinfection) were placed in an incubator at the appropriate temperature for the given microorganism (37°C, 25°C) and incubated for 48 hours to 5 days. The second open test plate was placed at a distance of 1 and 2,5 m and YANEX 2M disinfected for 1, 5 and 10 min. The plates were incubated in an incubator at the appropriate temperature for a specified time (up to 48 hours bacteria and up to 5 days molds). After the incubation time, the grown colonies were counted on control and test plates (disinfected plates with YANEX 2M). The test was carried out three times for each microorganism, and then the percentage decrease in the number of microorganisms was calculated according to the formula (1).

(1) $R = 100-(b \times 100/k)$

where:

R- percent reduction in the number of microorganisms

b- average number of microorganisms after UV disinfection [cfu/ml],

k- average number of microorganisms on control plates (without UV disinfection) [cfu/ml],

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Results

Table 1. Antimicrobial effectiveness of device YANEX 2M at a distance of 1 m

Strain	Microorganisms number on control plates without UV disinfection [cfu/ml]		Microorganisms number on control plates after, YANEX 2M disinfection [cfu/ml]								
			1 min			**5 min**			**10 min**		
		k		b	R[%]		b	R[%]		b	R[%]
Staphylococcus aureus ATCC 25923	1080	1003	0	0	100	0	0	100	0	0	100
	986		0			0			0		
	942		0			0			0		
		k		b	R[%]		b	R[%]		b	R[%]
Bacillus subtilis ATCC 6633	921	928	0	0	100	0	0	100	0	0	100
	929		0			0			0		
	934		0			0			0		
		k		b	R[%]		b	R[%]		b	R[%]
Escherichia coli ATCC 25922	920	927	0	0	100	0	0	100	0	0	100
	938		0			0			0		
	923		0			0			0		
		k		b	R[%]		b	R[%]		b	R[%]
Klebsiella pneumoniae subsp. *pneumoniae* ATCC 13883	947	953	0	0	100	0	0	100	0	0	100
	961		0			0			0		
	934		0			0			0		
		k		b	R[%]		b	R[%]		b	R[%]
Aspergillus brasiliensis (*A. niger*) ATCC 16404	924	912	120	104	88,6	0	0	100	0	0	100
	899		92			0			0		
	912		101		0	0			0		

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Table 2. Antimicrobial effectiveness of device YANEX 2M at a distance of 2,5 m

Strain	Microorganisms number on control plates without UV disinfection [cfu/ml]		Microorganisms number on control plates after YANEX 2M disinfection [cfu/ml]								
			1 min			**5 min**			**10 min**		
		k		b	R[%]		b	R[%]		b	R[%]
Staphylococcus aureus ATCC 25923	1080	1003	163	159	84,15	0	0	100	0	0	100
	986		158			0			0		
	942		155			0			0		
		k		b	R[%]		b	R[%]		b	R[%]
Bacillus subtilis ATCC 6633	921	928	155	155	83,30	0	0	100	0	0	100
	929		157			0			0		
	934		152			0			0		
		k		b	R[%]		b	R[%]		b	R[%]
Escherichia coli ATCC 25922	920	927	76	73	92,13	0	0	100	0	0	100
	938		70			0			0		
	923		74			0			0		
		k		b	R[%]		b	R[%]		b	R[%]
Klebsiella pneumoniae subsp. *pneumoniae* ATCC13883	947	953	20	37	96,12	0	0	100	0	0	100
	961		24			0			0		
	934		30			0			0		
		k		b	R[%]		b	R[%]		b	R[%]
Aspergillus brasiliensis (*A. niger*) ATCC 16404	924	912	280	275	69,85	60	59	93,53	0	0	100
	899		264			58			0		
	912		282			60			0		

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Conclusions

1. YANEX 2M disinfection from a distance of 1 m showed 100% bactericidal effectiveness, regardless of the time of operation.
2. During 1-minute of YANEX 2M disinfection from a distance of 1 m, a reduction of *Aspergillus brasiliensis* number by 88.60% was observed. With the extension of the disinfection time to 5 and 10 min, the reduction of mold count was 100%.
3. During YANEX 2M disinfection from a distance of 2.5 m, after 1 min, a reduction of microorganisms was 69.85% for *A. brasiliensis* and 96.12% for *Klebsiella pneumoniae*. With the extension of the exposure time, the degree of microbial reduction increased. For bacteria, it was 100%. For mold, 93.53% and 100% for 5 and 10 minutes respectively.

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